

## **CHAPTER 1 - INTRODUCTION AND SUMMARY**

In 1988, in response to regulations issued by the Washington Department of Ecology (Ecology), the Municipality of Metropolitan Seattle (Metro) and the City of Seattle (Seattle) completed separate planning efforts to address control of combined sewer overflows (CSOs). The 1988 agreement between Ecology and Metro was to reduce CSOs system-wide by 75 percent of the 1982 baseline (2.4 billion gallons) and reduce Denny Way CSO volumes by 50 percent of the 1982 baseline (405 million gallons) by the end of 2005. It was recognized that coordination of Metro's and Seattle's plans was required where important hydraulic interactions occurred between the two agencies' facilities. One of the most important of these coordination areas is between Seattle's system in the east and south Lake Union area, King County's Dexter Regulator on the Central Trunk with an overflow on the west side of Lake Union, and King County's Denny Regulator with an overflow to Elliott Bay at the foot of Denny Way. The Denny Way CSO is the largest volume CSO discharge in the King County system.

As further planning proceeded, it became evident that a coordinated effort would be advantageous in optimizing the two agencies' approach to CSO control in the Denny/Lake Union area. In 1992, a feasibility study (Brown and Caldwell and Metro 1992) was conducted to look at both Seattle's and Metro's systems upstream of the Denny Regulator. In 1994 when Clean Water Act funds became available for public combined sewer overflow projects, King County Metro and Seattle agreed to a cooperative effort to address control of the Lake Union/Denny Way CSOs and applied for a grant. An agreement was signed by the King County and Seattle City councils on October 23, 1995, to accept the EPA grant (King County as grantee and Seattle as subgrantee), to design and construct concurrent projects, and to share the costs proportionate to the benefit to each party. The agreement stated, "the combined projects will contribute to the improvement, enhancement and preservation of the region's water resources by significantly reducing the discharge of combined sewage into Lake Union and Elliott Bay."

The Denny Way/Lake Union Combined Sewer Overflow Control Project (hereinafter referred to as the Denny/Lake Union Project) is precedent setting for King County and Ecology because it will be the first CSO treatment facility constructed in Washington for the specific purpose of CSO control. Existing CSO treatment facilities (e.g., Carkeek Park) were primary treatment plants that were modified to control CSOs. Therefore, King County and Ecology are reviewing the state and federal CSO regulations and discussing the treatment requirements to maximize water quality benefits and meet project objectives while minimizing project costs.

### **1.1 CHANGES AND REFINEMENTS MADE AFTER DRAFT SEIS/EA WAS ISSUED**

Preliminary design continued and a value engineering study occurred after the draft joint document was issued. The main changes in the project design were realignment of the Mercer Street Tunnel, changes in pipeline alignments, refinement of outfall alignments and construction methods, and some changes in facility sizes and pipeline dimensions. In addition, discussions were held with the Washington Departments of Ecology and Natural Resources regarding remediation of contaminated sediments off shore of the Denny Way CSO.

## **Mercer Street Tunnel Realignment**

The draft joint document presented the tunnel with an Elliott Avenue Undercrossing, West Tunnel Portal, and a curve in the tunnel under the Seattle Center Parking Garage to Roy Street and continuing east to Dexter Avenue North. Further predesign lowered the tunnel by 20 feet and realigned it. The Mercer Street Tunnel is proposed to be tunneled from the Elliott West site under Elliott Avenue, Mercer Place, and Mercer Street to Broad Street and then turn northeast to the intersection of Roy Street and Eighth Avenue North.

## **South Lake Union Pipeline Alignments**

During preliminary design, an analysis of alternative pipeline alignments in the South Lake Union area was conducted. Each alternative was evaluated in terms of cost, construction difficulty, traffic impacts, and other related factors. As a result of the evaluation, an alignment on Eighth Avenue North rather than Westlake Avenue, between Republican and Roy streets, was selected for the Lake Union Tunnel CSO Pipeline.

## **Elliott Bay Subbasin Pipeline Alignments**

The draft joint document presented three alternatives for pipelines between the Denny Regulator, Elliott West CSO Control Facility, and the outfalls: 1) in Elliott Avenue, 2) in the Alaskan Way right-of-way between the railroad tracks, and 3) west of the railroad tracks on Port of Seattle property and the Alaskan Way right-of-way. A decision was made to propose an alignment for both the Elliott West CSO Pipeline and the Elliott West Effluent Force Main in the same trench. This alignment involves crossing under the railroad tracks from the Elliott West site to the west side of the railroad tracks and then paralleling the tracks on the west side of the fence and within Elliott Bay Park, which is owned by the Port of Seattle. The alignment through Myrtle Edwards Park is within the Alaskan Way right-of-way and existing King County right-of-way.

## **Outfall Refinements**

The draft joint document presented both outfalls as being the same length and depth. Further engineering refinements have modified the outfalls. The Denny Way CSO Outfall Extension will be a 96- to 120-inch diameter pipe extending approximately 90 feet offshore to a depth of 10 to 20 feet below MLLW. The Elliott West Outfall will be a 96- to 108-inch diameter pipe extending about 500 feet offshore to a depth of 60 to 70 feet below MLLW. A decision was made to place the offshore portions of the outfalls on piles and then cover with a concrete mattress, rather than trenching through the sediment cap.

## **Contaminated Sediment Remediation**

King County met with representatives from the Washington Department of Natural Resources and the Washington Department of Ecology after issuance of the draft joint document. The purpose of the meeting was to discuss potential requirements for sediment remediation offshore of the Denny Way CSO, which may occur during or after this project's construction phase. King County has agreed to work with the Department of Natural Resources and other affected agencies to develop a "Plan of Operations" that further characterizes the current sediment quality conditions near the existing Denny Way outfall. The sediment remediation of the historical contamination close to the Denny Way CSO is not included in the budget of the Denny/Lake Union Project, but will be addressed in King County's annual budget process with other CSO outfall sediment management plans.

## **Public Comments**

The draft joint document was modified to respond to comments received from agencies and the public. Appendix T includes a copy of all comments received on the draft joint document and the responses. Section 1.2 summarizes the comments.

### **1.2 GENERAL COMMENTS ON THE DRAFT SEIS/EA**

Over 300 copies of the draft SEPA SEIS/NEPA EA were distributed to potentially interested or concerned government agencies and officials with requests for comments. Twenty-one comment letters were received. A Public Hearing was also held with 15 verbal and written comments collected. Appendix T includes the hearing transcript, comment letters and responses to both verbal and written comments received during the comment period. The following summarizes the comments received:

- ◆ Alternatives: project alignments in Myrtle Edwards Park, selection of storage facility site in South Lake Union
- ◆ Earth Resources: erosion control measures, vibrations
- ◆ Air Resources: odors
- ◆ Water Resources: outfalls, operations plan for sediment quality, remediation, and monitoring
- ◆ Biological Resources: habitat issues, tribal fisheries, net pens, modeling efforts, shellfish
- ◆ Energy: electrical efficiency of new facilities
- ◆ Environmental Health: chemicals stored on site, spills
- ◆ Recreation: impacts to Myrtle Edwards Park and special events, improve bike paths
- ◆ Aesthetics: vertical elevations
- ◆ Transportation: public parking loss, ingress/egress to businesses, traffic, anchorage area
- ◆ Socioeconomics: taking or relocating businesses
- ◆ Other: project schedule, communication with community, West Point Settlement Agreement, facilities plan

## **1.3 PROJECT NEED**

### **Existing System**

Much of Seattle is served by a combined sewer system rather than separate sanitary and storm sewers. During wet weather, when the volume of sanitary sewage and stormwater entering the combined sewers exceeds the system capacity, the system is designed to overflow at several designated CSOs.

Operation of the wastewater conveyance system in the western portion of the Denny Way/Lake Union drainage basin is shared by the County and the City. Both systems discharge CSOs from this drainage basin into Lake Union. In addition, the County owns a major CSO facility that discharges into Elliott Bay at the Denny Way Regulator Station in Myrtle Edwards Park. Currently, CSO discharges occur at this location about 50 times per year, resulting in an annual average discharge volume of 405 million gallons (MG).

King County's existing wastewater conveyance and treatment system serving the Denny Basin project area consists of a wastewater treatment plant at West Point, the Elliott Bay Interceptor (EBI), the Interbay Pump Station, the Denny Way Regulator Station and Outfall, the Lake Union Tunnel, the Central Trunk, and the Dexter Regulator Station. The City's system consists of a new interceptor pipeline beneath Fairview and Eastlake avenues on the east side of Lake Union.

### **Regulatory Requirements**

Ecology has adopted a number of regulations pertaining to municipal waste discharges, including CSOs (WAC Chapter 173-245). The regulations require that CSOs be controlled "such that an average of one untreated discharge may occur per year." In addition, CSO treatment is defined as being the equivalent of primary treatment.

King County staff and consultants have met with Ecology staff to discuss the proposed Denny Way CSO Project and how it complies with state regulations. The project will function as a storage and transfer project during most storms, with flows transferred to the West Point Treatment Plant once capacity is available. At the West Point plant, the flows will generally receive secondary treatment. On average, about 50 percent of the annual CSO volume that enters the tunnel will be transferred to West Point.

During larger storms, flows from the tunnel will be treated at the Elliott West CSO Control Facility and discharged through the Elliott West Outfall. Floatables will be removed, and these flows will be disinfected and dechlorinated. During the largest storms (on average, once per year), flows will exceed the pumping capacity of the Elliott West facility, and there will be discharge of untreated CSO through the new outfall extension at the Denny Way Regulator Station.

Ecology has concurred informally that this combined approach, using both CSO storage/transfer and at-site treatment, appears to meet applicable state regulation. Through the National Pollutant Discharge Elimination System (NPDES) permitting process, the state will establish monitoring and reporting requirements for the future facilities. In NPDES permits for other CSO facilities in the King County system, Ecology has considered the treatment received by all flows entering a CSO facility on an annual

basis by giving credit for actual pollutant removal at the West Point plant for CSOs transferred there. The proposed Denny/Lake Union Project will operate in much the same fashion, by transferring more than half the annual volume to the West Point Treatment Plant, where the flows will usually receive secondary treatment.

Completion of the project would reduce CSOs into east, west and south Lake Union to once per year per outfall or less and reduce CSOs from the Denny Way CSO into Elliott Bay.

In January 1987, Ecology defined “the greatest reasonable reduction” to mean “control of each CSO such that an average of one untreated discharge may occur per year” and set this as a long-term goal without defining a specific target date (WAC 173-245-020 (22)). At the same time, Ecology recognized that such a limit could not be achieved in the short term and agreed that reducing CSO volumes by 75 percent system-wide by the end of 2005 was a reasonable interim goal for Metro. Metro’s *Final 1988 Combined Sewer Overflow Control Plan* (CWC-HDR et. al. and Metro 1988) described modifications made to previously-identified CSO projects following the *1986 Plan* and representative CSO projects to achieve Ecology’s requirement of a 75 percent CSO volume reduction in the overall service area over the next 20 years. It also identified CSO projects that could be added to this 20-year plan to achieve the ultimate goal of one untreated CSO event per outfall per year. That plan was approved by Ecology on August 8, 1988.

In November 1996, Ecology granted King County’s request to reconsider the 1988 plan approved by Ecology (Fricke 1996). The request is based on higher costs and additional projects required to reach the goal that were not anticipated in the 1988 CSO Plan. Ecology agreed that a revised schedule will be determined in the year 2000 but projects already scheduled for the 1995-2000 period should proceed (e.g., Alki, Denny, Henderson/Martin Luther King, Harbor, and Norfolk). In addition, the CSO Water Quality Assessment, a study to assess water and sediment quality in the Duwamish River and Elliott Bay, should be completed prior to a final decision on schedule.

## **1.4 PROJECT OBJECTIVES**

The Denny/Lake Union Project has been initiated to meet all current federal and state requirements for control of the City of Seattle CSO discharges into Lake Union and control of the County’s Dexter CSO to Lake Union and the Denny Way CSO to Elliott Bay. Table 1-1 compares each alternative to the overall project objectives.

The project has been developed jointly by the County and City because of the close relationship between the two systems in the Lake Union and Denny Way areas. Although the City and County could have addressed their CSOs in separate projects, independent solutions might have aggravated problems for the other jurisdiction and likely would have resulted in higher total costs for ratepayers. Therefore, the County and City worked cooperatively on a feasibility study for a combined project in the early 1990s and signed a Memorandum of Agreement in 1995 to jointly implement a multi-phase project to address these issues.

**Table 1-1**  
**Comparison of CSO Control Objectives By Alternative**

<b>Objective</b>	<b>Alternative 1 - CSO Storage and Treatment</b>	<b>Alternative 2 - Partial Separation and Storage</b>	<b>Alternative 3 - No Action Alternative</b>
<b>Control CSOs into Lake Union and Elliott Bay to one untreated overflow per outfall per year</b>	Meets objective; 2 city outfalls and King County's Dexter and Denny outfalls to one untreated per year	Meets objective; 2 city outfalls and King County's Dexter and Denny outfalls to one untreated per year	Does not meet objective; no reduction in CSOs
<b>Minimize shoreline, beach and park impacts consistent with shoreline management plan</b>	Meets objective in long term; includes extension of existing Denny outfall offshore	Does not meet objective; includes addition of four stormwater outfalls into Elliott Bay and one stormwater outfall into Lake Union	No change in impacts to shoreline, beach or park
<b>Provide lowest practicable level of impacts to residential and commercial neighborhoods, and transportation corridors</b>	Meets objective; tunnel construction requires only two portals, thus eliminating open cut over most of the project alignment	Does not meet objective; most streets in the project area would require trenching to place new stormwater pipes	Meets objective; no change in impacts to residential and commercial neighborhoods or transportation corridors
<b>Cost-effectiveness</b>	\$0.33/gallon	\$1.47/gallon	No construction costs but fines could be levied by EPA

King County is proposing to amend its Comprehensive Water Pollution Abatement Plan and Seattle is proposing to amend its Combined Sewer Overflow Control Plan by adopting a combined sewer overflow control project for the Elliott Bay and South Lake Union subbasins (Figure 1-1). The Denny/Lake Union Project has been divided into four phases. Phase 1 is a Seattle sewer enlargement project already completed by the City of Seattle along the east side of Lake Union. Phase 2 is a Seattle sewer project proposed along the south side of Lake Union connecting Phase 1 to Phase 3/4 and to transport flows from Lakeview Boulevard to Phase 1. The combined Phase 3/4 is a King County CSO storage/treatment project to reduce CSO volumes at the Denny Way Regulator Station and to treat all but one overflow per year. Phases 2 and 3/4 are necessary to reduce overflows as required by interim and final agreements between agencies.

King County is committed to coordinating with Seattle on project design, construction and post-project monitoring of flows into and out of the new facilities. Based on the monitoring data when the project comes on line (after 2003), King County will work with Ecology and Seattle to decide if further actions will be needed beyond the current proposal.

The concept of the project is to store CSO flows during times when overflows normally would occur. The combined wastewater would be diverted to the new Mercer Street Tunnel. During most storms, the storage capacity (eight million gallons) afforded by the tunnel would be adequate to contain the CSO flows until the upstream flows in the Elliott Bay Interceptor (EBI) subside and pipeline capacity becomes available. Stored wastewater would then drain or be pumped into the EBI and transported to West Point for treatment. During large storms, the storage capacity of the tunnel would be exceeded. Once the new Mercer Street Tunnel is full, the stored flows would be released to the Elliott West CSO Control Facility. Treated flows would be discharged to Elliott Bay through the new outfall. It is estimated that on average, the capacity of the tunnel and treatment system would be exceeded about once per year, and untreated CSOs would be discharged through the outfall extension off Myrtle Edwards Park.

## **1.5 CSO VOLUMES USED IN PROJECT**

Due to the nature of the project and the past agreements with Ecology, various CSO volumes are used throughout the document. The following descriptions should make it easier to understand the difference between the volumes and the reason we are using different numbers. Table 1-2 shows each of the volumes described below.

### **Baseline Volumes**

In 1981-83, it has been estimated that 405 MG per year overflowed at the Denny Way CSO. This period is the baseline because it is included in the 1988 CSO Plan and recognized by the Ecology as the volume to reduce for the CSO project. As shown on Table 1-2, the Lake Union CSO baseline is 101 MG per year (86 MG per year from Seattle's east Lake Union outfalls and 15 MG per year from King County's Dexter CSO).

**Figure 1-1**



**Table 1-2**  
**Annual Combined Sewer Overflows in the Denny/Lake Union Basin**  
**Comparison of Before and After Project Completion of the Preferred Alternative**

	<b><u>Average Total Volume</u></b> (MG/yr)	<b><u>Avg. Frequency per Outfall</u></b> (overflows/yr)
<b>BASELINE (1981-83)</b>		
<b><u>Lake Union CSOs</u></b>	<b>101</b>	<b>4 to 115</b>
Seattle's East Lake Union Outfalls	86	
<i>Phase 1 (4 outfalls)<sup>1</sup></i>	<i>73.2</i>	<i>10 to 115</i>
<i>CSO #125<sup>1</sup></i>	<i>3.2</i>	<i>30</i>
<i>CSO #175<sup>1</sup></i>	<i>9.6</i>	<i>115</i>
King County's Lake Union Outfall	15	
<i>Dexter Regulator<sup>2</sup></i>	<i>15</i>	<i>4</i>
<b><u>Elliott Bay CSOs</u></b>	<b>405</b>	<b>51</b>
Denny Regulator <sup>2</sup>	405	51
<b>Projected (Completion of Project)<sup>3</sup></b>		
<b>Untreated CSOs</b>		
<b><u>Lake Union CSOs</u></b>	<b>&lt;0.1</b>	<b>1 or less</b>
Seattle's East Lake Union Outfalls	<0.1	1 or less
<i>Phase 1 (4 outfalls)</i>	<i>&lt;0.1</i>	<i>1 or less</i>
<i>CSO #125</i>	<i>0</i>	<i>0</i>
<i>CSO #175</i>	<i>0</i>	<i>1</i>
King County's Lake Union Outfall	1.0	
<i>Dexter Regulator</i>	<i>1.0</i>	<i>1</i>
<b><u>Elliott Bay CSOs</u></b>	<b>7</b>	<b>1</b>
Denny Regulator	7	1
<b>Total Untreated CSOs</b>	<b>8</b>	<b>1 or less</b>
<b>Treated Flows</b>		
Treated at Elliott West site	281	
Treated at West Point	278	
<b>Total Treated Flows</b>	<b>567</b>	<b>8 to 20</b>

<sup>1</sup> Source: Brown and Caldwell and Seattle Engineering Department 1988.

<sup>2</sup> Source: Brown and Caldwell/KCM and Associated Firms and KCWPC 1995a.

<sup>3</sup> Source: Brown and Caldwell/KCM and Associated Firms and KCWPC 1998.

## **Projected Volumes**

The projected volumes are the flow volumes once the Denny/Lake Union Project is on line. As Table 1-2 shows, approximately 1 MG per year would still overflow untreated from King County's Dexter Regulator and approximately less than 0.1 MG per year would still overflow untreated from Seattle's east Lake Union outfalls. The projected flows at the Denny Regulator after project completion would be approximately 567 MG per year, of which 559 MG per year would be treated and approximately 8 MG per year would be untreated. Flow conditions for the King County portions of the project from 1978-1997 are summarized in Table 1-3.

## **1.6 POTENTIAL BENEFITS OF PROJECT**

Completion of the project would reduce untreated CSOs into east, west and south Lake Union and from the Denny Way CSO to once per year per outfall or less, as required by state regulations. Table 1-2 provides baseline estimates of average total overflow volume and average overflow frequency for outfalls included in the Denny/Lake Union Project and also estimates volume and frequency after completion of the Preferred Alternative. As the table illustrates, the operation of the proposed project would result in a decrease of approximately 100 MG per year of untreated CSOs to Lake Union and almost 400 MG of untreated CSOs per year to Elliott Bay.

The primary benefit of reducing CSOs is improved water quality and a reduction in the potential for adverse human health and environmental impacts. The reduction in CSOs would also reduce the sediment loading to area waters, thus reducing continued accumulation of contaminated sediments on the bottom of Lake Union and Elliott Bay.

## **1.7 ENVIRONMENTAL REVIEW**

This final joint document has been prepared by King County and Seattle to meet the requirements of and prepared in accordance with the State Environmental Policy Act (SEPA) (RCW 43.21C), the SEPA Rules (WAC 197-11), King County SEPA procedures (Chapter 20.44 King County Code), the National Environmental Policy Act (NEPA) (42 USC 4321 et seq.), Environmental Protection Agency (EPA) Implementing regulations (40 CFR Part 6), and Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508). King County is the SEPA lead agency for the Phases 2 and 3/4 SEPA Supplemental Environmental Impact Statement (SEIS) with the City of Seattle as a cooperating agency. EPA is the NEPA lead agency for Phases 2 and 3/4 for the NEPA Environmental Assessment (EA). This SEPA SEIS/NEPA EA is hereinafter referred to as the "final joint document."

This final joint document is part of a King County "phased" environmental review process which began with a final EIS issued in 1985 on Metro's system-wide plan for Secondary Treatment Facilities and Combined Sewer Overflow Control (1985 FEIS). The 1985 FEIS was supplemented in 1986 to address additional system alternatives (1986 SEIS). In February 1995, the 1986 SEIS was amended by a new CSO control plan and SEPA addendum based on additional information collected by Metro (1995 Update). This final joint document is also part of a Seattle "phased" environmental review

Table 1-3

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process which began with a 1988 FEIS for Combined Sewer Overflow Control Plan. This final joint analysis for the Denny/Lake Union Project. These related documents are incorporated by reference (see Fact Sheet). Appendix A lists the environmental documents for the project issued to date and briefly project.

The purpose of this final joint document is to identify the impacts of the Preferred Alternative to control CSOs into south Lake Union and Elliott Bay at the Denny Way CSO outfall and to respond to

significant environmental impacts of Phases 2 and 3/4 of the Denny/Lake Union Project. A Preferred Alternative, Alternative 1 - CSO Storage and Treatment, has been selected by King County and Seattle.

Further refinements may be made in the design of the project as the engineering work proceeds. If the environmental process, EPA, King County and Seattle will evaluate the potential environmental impacts to determine if these alignments or locations will result in environmental impacts that are outside the environmental documents, such as addenda, may be prepared in the future to address impacts not considered in this environmental document.

## **SCOPE OF FINAL JOINT DOCUMENT**

This final joint document has been prepared under the terms of a Memorandum of Agreement between public to understand the environmental consequences of the alternative selected for final design compared to the other project alternatives and will support permit applications for the project. impacts of each.

Because the current proposal is consistent with King County's and the City's prior system-wide planning efforts and environmental review, the scope of this supplemental EIS focuses on the evaluation the Denny Way CSO to one overflow per year per outfall in an average rainfall year.

All previous King County planning documents (see Appendix A) included projects to address the Denny Way CSO and Dexter CSO. The previous Seattle planning document included projects to address the

alternatives to reduce CSOs to south, east and west Lake Union to one event per outfall per year and to control Denny Way CSOs. The major difference between most of the previous environmental

preferred alternative to reduce CSOs in the past. Due to current water quality regulations, costs of separation, and the potential for future regulations on stormwater, King County and Seattle prefer to

receiving waterbodies. The planning process which led to the proposed CSO control approach and this

re-evaluation of partial separation has been long and complex. Section 2.3 provides an overview of the City's and King County's CSO planning process in order to help the reader understand the scope of the final joint document.

Therefore, the final joint document constitutes project-specific environmental review for the amendment of the County's and the City's comprehensive plans to control CSOs into Lake Union and at the Denny Way CSO. This final joint document supplements the analysis of alternatives, impacts and mitigation measures discussed in the draft joint document and previous Metro and Seattle documents described in Appendix A.

## **1.9 ESTIMATED PROJECT COSTS AND RATE IMPACTS**

Each year, the King County budget process establishes the monetary requirements for the disposal of sewage. These requirements include administration, operating, maintenance repair/replacement, necessary capital reserves, and the requirements of bond resolutions. For 1998 and 1999, the established King County sewer rate is \$19.10 per month per residential customer. This rate captures the impact from all King County wastewater capital projects including the Denny/Lake Union Project and ongoing operating expenditures. The Denny/Lake Union Project receives no money from the State Revolving Fund because these funds cannot be used for CSO treatment. Therefore, there are no impacts related to this fund at present.

Additionally, the project has been awarded a \$35.0 million Infrastructure Grant by EPA. King County and the City of Seattle share this grant, with \$6.5 million reserved for Phases 1 and 2 and \$28.5 million reserved for Phase 3/4. The effect of this grant is described below.

### **User Rate Impacts for Selected Alternative: Alternative 1 – CSO Storage and Treatment**

Table 1-4 summarizes the most probable estimated order-of-magnitude project costs escalated up through the point of award of all of construction contracts (2001). Total estimated project cost including City of Seattle Phase 1 and Phase 2 work is \$164.3 million.

The total rate impact for the preferred alternative for 1999 is estimated to be \$0.02 of the \$19.10 sewer rate, rising to \$0.95 - 1.14 of the total rate by project completion in the year 2004. The EPA infrastructure grant of \$28.5 million (King County's share of the grant) reduces the rate impact of the Denny/Lake Union Project by \$0.07 in 2000 and \$0.27 by the year 2004.

Table 1-5 shows the anticipated King County rate impact from Alternative 1 on a year by year basis, both with and without the EPA Infrastructure Grant. This table should not be construed as a user rate forecast; the figures shown only attempt to demonstrate the impact of the Denny/Lake Union Project and the EPA Infrastructure Grant on a year by year basis. The ultimate user rate is comprised of a number of factors, including initiatives such as the Regional Wastewater Services Plan and other projects that may occur many years from now.

**Table 1-4**  
**Estimated Project Costs**

(Capital costs in millions of dollars at time of expenditure)

	<b>Phase 1</b> (Seattle)	<b>Phase 2</b> (Seattle)	<b>Phase 3/4</b> (King County and Seattle)	<b>Total Project</b>
<b><i>Estimated Construction Cost</i></b> Construction Costs including Contingencies and Sales Tax	\$12.8	\$4.4	\$104.8	<b>\$122.0</b>
<b><i>Estimated Non-construction Costs</i></b> Engineering, Administrative and Land/Permit Acquisition Costs	3.2	1.7	37.4	<b>42.3</b>
<b><i>Most Probable Project Cost</i></b>	<b>16.0</b>	<b>6.1</b>	<b>142.2</b>	<b>\$164.3</b>
<b><u>Funding Sources</u></b>				
King County			94.4	<b>\$94.4</b>
Federal grant	5.2	1.3	28.5	<b>35.0</b>
City of Seattle cost share	10.8	4.8	19.3	<b>34.9</b>
<b><i>Estimated Annual O&amp;M Costs</i></b>	<b>\$100,000</b>	<b>\$20,000</b>	<b>\$501,000</b>	<b>\$621,000</b>

Note: Construction cost estimate for Phase 3/4 is based on fourth quarter 1997 dollars (ENR Seattle Construction Cost Index of 6640), escalated to time of construction. The range of accuracy for the Phases 3/4 construction cost estimate is +20% to -15%, thus giving a range of probable construction cost between \$89.1 and \$125.8 million.

**Table 1-5**  
**King County Component Rate Impact**  
**Preferred Alternative - CSO Storage and Treatment (the Preferred Alternative)**

	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>
Component Rate Impact without EPA Infrastructure Grant	\$0.02	\$0.18-.22	\$0.43-.52	\$0.67-.80	\$0.88-1.06	\$0.95-1.14
Component Rate Impact of EPA Infrastructure Grant	\$0.00	\$0.07	\$0.17	\$0.26	\$0.27	\$0.27
Net Rate Impact with EPA Infrastructure Grant	\$0.02	\$0.11-.15	\$0.26-.35	\$0.41-.54	\$0.61-.79	\$0.68-.87

Note: Range of rate impacts shows 1) rate with estimated Phase 3/4 construction cost as shown in Table ES-2 (\$104.8 million) and 2) rate with construction cost at high end of range of probable construction costs (\$125.8 million).

Sources of funds for wastewater capital improvement program include:

- ◆ Contribution from the operating fund (Customer Charges {sewer rate}, Investment Income, Capacity Charge, City of Seattle CSO Charge, and Other Miscellaneous Revenue {Industrial Surcharge Fees, Septic Tank Disposal Fees, Sale of By-Products, and small amounts of additional miscellaneous contributions})
- ◆ Capital Fund Sources (Proceeds From Bond Sales, Short-Term Borrowing, and Other Capital Revenues {non-operating and capital revenues})

### **User Rate Impacts for Alternative 2 - Partial Separation and Storage**

Table 1-6 shows the probable estimated order of magnitude project cost for Alternative 2. This alternative was not considered further due to the excessive construction disruption and ultimate project cost. Total project cost including City of Seattle Phases 1 and 2 is \$309.3 million escalated up through the point of award of all construction contracts (2001).

The total rate impact for Alternative 2 for 1999 is estimated to be \$0.02 of the \$19.10 sewer rate, rising to \$2.07 of the total rate by project completion in the year 2004. The EPA infrastructure grant of \$28.5 million (King County's share of the grant) reduces the rate impact of the Denny Way project by \$0.27 by the year 2004.

Table 1-7 in shows the anticipated King County rate impact from Alternative 2 on a year by year basis, both with and without the EPA infrastructure grant.

## **1.10 PUBLIC AND AGENCY REVIEW**

The draft joint document was circulated to 300 agencies, groups and individuals for a 30-day comment period plus a 19-day extension. A public hearing was also conducted on June 12 with 18 people in attendance. Twenty-one comment letters were received during the review period and are reprinted in Appendix T with a response to each comment. During the comment period, King County also received over 85 phone calls regarding the environmental process or documents.

The final joint document is being circulated to agencies and the members of the public who have attended meetings or submitted comments (see Chapter 12). A larger mailing list of over 10,000 addresses received a newsletter in December describing the project and giving notice of availability for the final joint document. Official Notice of Availability of the final joint document will be sent to approximately 425 interested parties and printed in two local newspapers. As per SEPA regulations, no SEPA action will be taken for seven days after issuance of the final SEPA SEIS/EA. As per NEPA regulations, no action will be taken for 30 days after issuance of the Finding of No Significant Impact (FONSI) with the final NEPA EA.

**Table 1-6**  
**Estimated Project Costs**  
**Alternative 2 – Partial Separation and Storage**  
 (Capital costs in millions of dollars at time of expenditure)

	<b>Phase 1</b> (Seattle)	<b>Phase 2</b> (Seattle)	<b>Phase 3/4</b> (King County and Seattle)	<b>Total Project</b>
<b><i>Estimated Construction Cost</i></b> Construction Costs including Contingencies and Sales Tax	\$12.8	\$6.2	\$220.9	<b>\$239.9</b>
<b><i>Estimated Non-construction Costs</i></b> Engineering, Administrative and Land/Permit Acquisition Costs	3.2	1.8	64.4	<b>69.4</b>
<b><i>Most Probable Project Cost</i></b>	<b>16.0</b>	<b>8.0</b>	<b>285.3</b>	<b>\$309.3</b>
<b><u>Funding Sources</u></b>				
King County			213.1	<b>\$213.1</b>
Federal grant	5.2	1.3	28.5	<b>35.0</b>
City of Seattle cost share	10.8	6.7	43.7	<b>61.2</b>
<b><i>Estimated Annual O&amp;M Costs</i></b>	<b>\$100,000</b>	<b>\$20,000</b>	<b>\$1,300,000</b>	<b>\$1,400,000</b>

Note: Construction cost estimate for Phase 3/4 is based on fourth quarter 1997 dollars (ENR Seattle Construction Cost Index of 6640), escalated to time of construction. The range of accuracy for the Phases 3/4 construction cost estimate is +20% to -15%, thus giving a range of probable construction cost between \$89.1 and \$125.8 million.

**Table 1-7**  
**King County Component Rate Impact**  
**Alternative 2 – Partial Separation and Storage**

	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>
Component Rate Impact without EPA Infrastructure Grant	\$0.02	\$0.41	\$0.96	\$1.48	\$1.96	\$2.07
Component Rate Impact of EPA Infrastructure Grant	\$0.00	\$0.07	\$0.17	\$0.26	\$0.27	\$0.27
Net Rate Impact with EPA Infrastructure Grant	\$0.02	\$0.34	\$0.79	\$1.22	\$1.69	\$1.80

Note: Range of rate impacts shows 1) rate with estimated Phase 3/4 construction cost as shown in Table ES-2 (\$104.8 million) and 2) rate with construction cost at high end of range of probable construction costs (\$125.8 million).



## **1.11 ALTERNATIVES**

Three alternatives are compared in this final joint document. The alternatives are numbered and named by type of facilities. Alternatives 1 and 2 are CSO control alternatives. Alternative 1, selected for final design, involves transporting flows from the South Lake Union area through a tunnel to the Elliott West site and then on to the EBI or the new outfall. Alternative 2 involves storing flows in the South Lake Union and Elliott Bay areas, conveying stored flows through the existing Lake Union Tunnel, and then on to West Point through the EBI. Alternative 3 is the No Action Alternative. Alternative 1 - CSO Storage and Treatment has been selected by King County and Seattle for final design.

A detailed description of the alternatives is provided in Appendix Q. In addition, tables describing the facilities and figures showing the location of facilities are included in Chapter 3. The location of facilities and alignments of the tunnel and pipelines for each alternative are subject to refinement in final design. The locations and dimensions as described provide general corridors and sizes for the purpose of environmental review. A summary of other alternatives that were considered but eliminated from further consideration are also presented in Chapter 3. Each alternative is briefly described below.

### **Selected Alternative: Alternative 1 - CSO Storage and Treatment**

*Alternative 1 was selected by King County and Seattle for final design to reduce CSOs into south and west Lake Union and into Elliott Bay from the Denny Way CSO.*

This alternative would control Lake Union and Denny Way CSOs by: 1) storing CSO flows during moderate storms and transferring them to the West Point Treatment Plant after the storm subsides, and 2) providing at-site treatment at the Elliott West site during heavy rain conditions with discharge of treated flows through a new outfall. Required facilities would include a CSO control facility with the following components: a tunnel for CSO storage under Mercer Street between Elliott Avenue West and the intersection of Roy Street and Eighth Avenue North, facilities at the Elliott West site to provide at-site treatment during one-year and larger storms, and pump stations to transfer flows in and out of the facility. Piping and regulators to convey CSO flows from the existing sewer system to the new facilities would also be required. The existing Denny Way CSO outfall located in Myrtle Edwards Park, which would be used when storage and treatment capacity are exceeded, would be extended off shore and a new outfall for treated flows from the Elliott West site would parallel the outfall extension to discharge treated flows to Elliott Bay.

### **Not Selected: Alternative 2 - Partial Separation and Storage**

Alternative 2 would control Lake Union and Denny Way CSOs by: 1) reducing CSO volumes by installing new storm sewers to handle street runoff, and 2) storing remaining CSO flows during moderate storms and transferring the flows to the West Point Treatment Plant after the storm subsides. Required facilities would include 24 miles of new storm sewers in streets in the lower Queen Anne, South Lake Union, and Denny Regrade areas; new stormwater outfalls at street ends along Elliott Bay; and a new overflow from the storage tank in south Lake Union to the lake. CSO control facilities would include the following components: a tank for CSO storage in the South Lake Union area, a tank for CSO storage at the Elliott West site, and pump stations to transfer flows in and out of the facilities.

Piping and regulators would also be required to convey CSO flows from the existing sewer system to the new facilities.

### **Not Selected: Alternative 3 - No Action Alternative**

Under Alternative 3, King County and Seattle would not build any CSO facilities to reduce CSO flows. Over 500 MG a year of CSOs would continue to overflow into south Lake Union and Elliott Bay. Alternative 3 would not meet the current federal or state regulations for CSO reduction or meet King County or Seattle's CSO reduction agreements with Ecology. This alternative is carried through the complete environmental analysis as per NEPA requirements.

## **1.12 IMPACTS AND MITIGATION MEASURES**

Table ES-1 in the Executive Summary comparatively summarizes the impacts and mitigation measures of the three alternatives and provides general mitigation measures. The table documents that no significant impacts which cannot be mitigated would occur from construction and operation of the project.

Alternative 1 - CSO Storage and Treatment and Alternative 2 - Partial Separation and Storage would result in construction impacts, including short-term adverse impacts on noise, air quality, traffic, and water quality. Mitigation measures primarily focus on reducing construction impacts, such as restricting construction to daytime hours and other measures to minimize noise during construction (see Chapter 10). Alternatives 1 and 2 would also result in beneficial long-term impacts from operation of the project facilities which would improve water quality and reduce environmental health risks. Water quality improvement would enhance biological habitat, recreational resources, and aesthetics of the water resources. Operational impacts such as odor would be minimized by incorporating odor control facilities into project design and operating facilities. Visual impacts would be minimized by architectural treatment of facilities and utilizing landscaping and plant design.

Alternative 3 (No Action) would not require construction of facilities, therefore, no construction impacts would occur. Alternative 3 would result in adverse water quality impacts and increase environmental health risks due to the continuation of current levels of CSOs to Lake Union and Elliott Bay.

## **1.13 IMPACTS THAT MAY NOT BE FULLY MITIGATED**

Mitigation measures include those that are part of the basic design and those that King County and Seattle have committed to implementing. Chapters 5, 6, 7, 8 and 9 of this final joint document compare the impacts of all three alternatives. The following list of impacts are those that could have some impacts even after mitigation measures are implemented; however, the impacts would not be significant. A brief description of mitigation to reduce the impact is in parentheses with the corresponding mitigation measure number; Chapter 10 contains a complete list of mitigation measures.

- ◆ Odor problems may occur during low flow conditions near tunnel portals, storage tanks, sewer lines, or outfalls (include odor control facilities, AR-3)
- ◆ Temporary increase in sediment loading to receiving waters (implementation of erosion control measures, ER-1)
- ◆ Short-term disturbance or displacement of aquatic habitats during construction in shoreline or near-shore areas (minimize duration of disturbance, BR (1)-3)
- ◆ Long-term disturbance or displacement of fish and shellfish resources in the immediate vicinity of the outfalls (coordinate with resource agencies, BR (1)-6)
- ◆ Temporary risk of spills from use of fuels, oils, solvents, and other materials during construction (develop Hazardous Material Plan and Spill Prevention Plan, EH-1)
- ◆ Temporary loss of recreation space during construction near Myrtle Edwards Park (restrict construction activity during highly attended public events, R-1; establish detour routes for bicycle/pedestrian pathways, R-2; see Appendix V)
- ◆ Visibility of aboveground portions of the CSO control facility (add architectural treatment to aboveground facilities, AT-2 and AT-3)
- ◆ Glare from lights at the CSO control facility (design security lighting to avoid glare, AT-6)
- ◆ Temporary restriction of access and general disturbance of business activity during construction in road rights-of-way (minimize disruptions of access to abutting properties, TR-2; provide advanced notification of access restrictions, TR-6)

## **1.14 REMAINING ISSUES TO BE RESOLVED**

This section briefly describes various issues that will need to be resolved during final design of the Denny/Lake Union Project.

### **West Point Settlement Agreement and West Point NPDES Permit**

The West Point Settlement Agreement places limits on the discharge of pollutants from the West Point Treatment Plant. "Section 2. Plant Capacity" of the agreement states:

"Metro shall have the right to increase the capacity of the treatment plant above an average wet weather flow ("AWWF") of 133 mgd so long as the plant size limitations of section 3 are met, and so long as the annual discharge of pollutants by weight is no greater than the annual discharge of pollutants by weight which is permitted by applicable water quality standards (30 mg/l for SS and BOD) for the plant operating at 133 mgd (AWWF)."

The West Point Settlement Agreement limits the annual pollutant discharge from the plant. Thus, as CSO flows are directed to the West Point plant by projects such as the Denny/Lake Union Project, it is important to confirm that the increased pollutant discharge is within the limits established by the settlement agreement. In order to determine the numerical limits established by the settlement agreement, it is necessary to refer to the NPDES permit, since it establishes the annual pollutant discharge allowed for the plant operating at 133 mgd.

The NPDES permit allows discharge of biological oxygen demand (BOD) and total suspended solids (TSS) at 54,000 pounds per day for each. Thus, the settlement agreement allows a total BOD and TSS

discharge of 19.7 million pounds per year. The West Point Treatment Plant currently discharges approximately 5.5 million pounds per year of BOD and 4.6 million pounds per year of TSS, a total of 10.1 million pounds per year. The BOD and TSS daily discharge averages 22,000 and 21,000 pounds per day, respectively. The current discharges are significantly less than the daily and annual limits established in the NPDES permit for the plant.

After completion of the Denny /Lake Union Project, stored CSOs would be released to the Elliott Bay Interceptor (EBI) as capacity becomes available after storms. These flows would then be conveyed to West Point for treatment. The average annual Denny/Lake Union CSO storage volume of 443 million gallons would represent approximately one percent of the average annual volume of sewage treated at West Point. The addition of stored Denny CSO flows to the West Point plant flows would increase plant discharges from 43.2 billion gallons per year to 43.7 billion gallons per year (Bergman and Swarner 1997). The annual BOD and TSS discharges would also increase by approximately one percent to 5.6 million pounds per year BOD and 4.6 million pounds per year TSS. These BOD and TSS annual discharges would be well below the settlement agreement limits.

This increase in discharge would have an associated increase in localized loading of pollutants to Puget Sound in the vicinity of the West Point Treatment Plant outfall and/or waters off Discovery Park. However, the loadings would comply with NPDES permit limits for the 133 mgd plant and, thus, the West Point Settlement Agreement.

### **Approach to CSO Reduction**

Over the past ten years, CSOs have become more closely scrutinized by EPA and Ecology. In 1988, Ecology determined that in Washington State, CSOs must be reduced to one overflow per outfall per year (WAC 173-245-040). In 1994, EPA issued the nationwide CSO policy, which stated that CSOs must be reduced to four to six events per year per outfall based on the sensitivity of the waterbody. These two CSO control standards are called “presumptive,” because they presume that water quality standards will be met with the prescribed level of control. Another EPA approved way to set CSO overflow limits is to use a “demonstrative” approach, which looks at whether there are harmful effects from current conditions of CSOs and then determines the overflow limits based on these effects. King County is currently completing a Water Quality Assessment to determine the effect of Seattle area CSOs on the Duwamish River and Elliott Bay. Once the study is completed in 1998, King County will present the findings to Ecology for consideration in future CSO decisions, including final design of the Denny/Lake Union Project.

### **Design Issues**

Final design and determination of detailed alignments will require completion of geotechnical, geographical, and oceanographic investigations. Preliminary studies have been completed, but further investigations need to be conducted during the final design phase. The final outcome of these studies will determine if sediment or groundwater contamination exists along the project alignment as well as the final outfall configuration. The final configurations of all facilities and the hydraulic requirements will assist in determining whether odor control is necessary at regulator stations, discharge manholes, or diversion structures. Based on the estimated flow rates and expected frequency of storms, standby power may be necessary at the Lake Union Tunnel Regulator Station. The amount of imported backfill

material, groundwater dewatering, and foundation support can be estimated only after subsurface geotechnical conditions are determined.

## **Outfall Locations**

The location and depth of the end of the new outfall and the extension of the existing Denny outfall will be studied further during final design. Water circulation data in Elliott Bay and bottom profiles have been collected. Extension of King County's on-going water quality and sediment impact modeling will also be required. Once the final design of the on-shore facilities are completed, the exact outfall depth and size will be determined. This document provides outfall pipes based on the current alternatives, however, fine-tuning during final design could modify the facilities and require fine-tuning the outfalls.

## **Sediment Remediation**

King County will work with the Department of Natural Resources and other affected agencies to develop a "Plan of Operations" that further characterizes the current sediment quality conditions near the existing Denny Way outfall. The plan will establish requirements for future sediment monitoring and will include a preliminary plan and schedule for addressing remediation of existing sediment contamination. A draft Plan of Operations will be submitted with the lease application. While sediment remediation of historical contamination close to the Denny Way CSO is not within the authorized budget of the Denny/Lake Union Project, King County will evaluate remediation alternatives within the context of system-wide CSO projects and select a remediation alternative consistent with construction of the project. Environmental monitoring resources would need to be dedicated to the needs of this project. This may require balancing with other project needs and will be addressed in King County's annual budget process.

## **Permits**

King County and Seattle will begin to apply for land use, shoreline, and other permits and approvals as required. The permits listed in Table 1-8 are potentially required by the project. A Shellfish and Domestic Wastewater Outfall Permit would not be required because the Washington Department of Health would not certify the harvesting of shellfish within Elliott Bay, regardless of construction of the new outfall, due to past and present sources of pollution which present a human health concern for consumption of shellfish from Elliott Bay (see Letter 5 in Appendix R).

## **Tribal Treaty Shellfishing**

In 1994, Treaty Tribes, the United States and the State of Washington agreed in *United States v. Washington*, No. 9213, Subproceeding 89-3 Consent Decree regarding shellfish sanitation issues, to implement certain procedures to regulate Treaty Shellfishing activities for public health purposes. In the appendix to that consent decree, the parties agreed that, at a minimum, the policies and criteria of the National Shellfish Sanitation Program Manual will govern their shellfishing activities within certified or decertified harvest areas.

**Table 1-8**  
**Permits Potentially Required by the Denny/Lake Union Project**

<b><u>JURISDICTION</u></b>	<b><u>PERMITS</u></b>
Federal	<ul style="list-style-type: none"> <li>◆ Army Corps of Engineers Section 404</li> <li>◆ Army Corps of Engineers Section 10</li> </ul>
State of Washington	<ul style="list-style-type: none"> <li>◆ Coastal Zone Management Certification</li> <li>◆ Department of Natural Resources Dredge Disposal</li> <li>◆ Department of Natural Resources Aquatic Lands ROW</li> <li>◆ Department of Ecology Water Quality Certification</li> <li>◆ National Pollutant Discharge Elimination System</li> <li>◆ Temporary Modification of Water Quality Standards</li> <li>◆ Department of Fish &amp; Wildlife Hydraulic Project Approval</li> <li>◆ Department of Transportation Permit to Occupy State DOT Right-of-Way</li> </ul>
King County	<ul style="list-style-type: none"> <li>◆ King County Industrial Waste Discharge</li> </ul>
City of Seattle	<ul style="list-style-type: none"> <li>◆ Building</li> <li>◆ Utilities</li> <li>◆ Shoreline Substantial Development</li> <li>◆ Grading</li> <li>◆ Master Use</li> <li>◆ Parks Use</li> <li>◆ Street Use</li> </ul>
Puget Sound Air Pollution Control Agency (PSAPCA)	<ul style="list-style-type: none"> <li>◆ Notice of Construction and Application for Approval</li> </ul>
Burlington Northern/Santa Fe Railroad (BNSFRR)	<ul style="list-style-type: none"> <li>◆ Pipeline Crossing</li> </ul>

## **1.15 PROJECT SCHEDULE**

This document is the final project-level SEPA SEIS/NEPA EA for the Denny/Lake Union Project. Once the final joint document and Facilities Plan are finalized and approved, final design of Alternative 1 will commence. Construction is expected to begin in 2000 with completion in the year 2003. Figure 1-2 illustrates the anticipated schedule for Phases 2 and 3/4.

It is estimated that Phases 2 and 3/4 could take approximately three years to construct. Area businesses and residents would not experience construction impacts for the entire duration of the construction period, but would be most affected by the timing of activities within their immediate neighborhood. To minimize the duration and extent of localized impacts and cumulative impacts, Seattle and King County would develop construction mitigation plans.

### **Probable Construction Schedule Restrictions**

Numerous annual events are scheduled in the project area, especially at the Seattle Center and Myrtle Edwards Park. It is highly probable that construction activities in some portions of the project area would be restricted during events such as 4th of July Fireworks, Folklife Festival, Bite of Seattle, and Bumbershoot Festival, which annually draw 100,000 to 500,000 spectators. In addition, there are numerous events occurring at the Seattle Center on a daily basis, such as professional sports, high school sports, performing arts, festivals, trade shows, and other events which may impact construction schedules. Restrictions to protect fish migrations may also impose constraints on outfall construction. Preliminary discussions with the Army Corps of Engineers (COE) and the Washington Department of Fish and Wildlife (WDFW) indicate that the probable in-water construction window is from approximately June 16th through March 14 to avoid the juvenile salmonid outmigration from about March 15th through June 15th each year.

Figure 1-2